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| 10/784,827 | 02/24/2004 | Hiroto Sugahara | 8001-1184 | 8483 |

466 7590 02/02/2007
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| EXAMINER |
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LEUNG, WAI LUN

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| ART UNIT | PAPER NUMBER |
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2613

| SHORTENED STATUTORY PERIOD OF RESPONSE | MAIL DATE | DELIVERY MODE |
|--|------------|---------------|
| 3 MONTHS | 02/02/2007 | PAPER |

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/784,827

Applicant(s)

SUGAHARA, HIROTO

Examiner

Danny Wai Lun Leung

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 February 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 2/24/2004.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1, 2, 8, and 9 are rejected under 35 U.S.C. 102(e) as being anticipated by **Fee et al.** (*US006650842B1*).

Regarding to claims 1 and 8, **Fee** discloses a optical transmission system (*fig 10*) comprising an optical transmission line (*34, fig 10*) for transmitting an optical signal from an optical transmitter (*32, fig 10*) to an optical receiver (*38, fig 10*), comprising a plurality of optical amplification repeaters (*60, fig 10*) distributed in said optical transmission line; wherein said optical transmission line is partitioned into a plurality of transmission spans by said plurality of optical amplification repeaters (*repeaters 60 separates the transmission line into 3 spans, as shown in fig 10*); at least one of said transmission spans is provided with a plurality of dispersion compensation elements (*64, fig 10*) for compensating for wavelength dispersion caused by said transmission line fiber (*col 7, ln 6-17*), said dispersion compensation elements substantially not adding to a length of said span and at least one of said plurality of dispersion compensation

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elements is arranged in said optical amplification repeater (*as shown in fig 10, Dispersion Compensator 64 is arranged in repeater 60, and does not substantially add to a length of the fiber span 34*).

As to claims 2 and 9, **Fee** further teaches wherein: said optical amplification repeater is provided with a concentrated amplifier (*72, fig 10*) for intensively amplifying optical signals in it (*col 7, ln 9-14*), and said concentrated amplifier is arranged behind a dispersion-compensating element (*64, fig 10*) arranged in said optical amplification repeater (*60, fig 10; col 7, ln 2-6*).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 3 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Fee et al.** (*US006650842B1*), in view of **Kosaka et al.** (*US006195480B1*).

Regarding claims 3 and 10, **Fee** discloses the system in accordance to claims 1 and 8 as discussed above. **Fee** does not disclose expressly wherein: said optical amplification repeater is provided with an excitation light source for distributed-amplifying an optical signal and an excited light input means for inputting said excited light into said transmission line fiber, and said excited light input means is arranged before a dispersion compensation element arranged in said optical amplification repeater. **Kosaka**, from the same field of endeavor, teaches an optical amplification repeater (*11, fig 13*) is provided with an excitation light source (*61₃, fig 13*) for

distributed-amplifying an optical signal and an excited light input means (62₃, fig 13) for inputting said excited light into a transmission line fiber (63₃, fig 13), and said excited light input means is arranged before a dispersion compensation element (67₃, fig 13) arranged in said optical amplification repeater (col 18, ln 10-67). Therefore, it would have been obvious for a person of ordinary skill in the art at the time of invention to use an excitation light source onto **Fee's** repeater as suggested by **Kosaka**. The motivation for doing so would have been to be able to provide an amplification that has a high enough optical power gain to compensate for dispersion.

6. Claims 4 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Fee et al.** (US006650842B1), in view of **Sugahara et al.** (9,000-km transmission of 32 x 42.7 Gb/s dense-WDM signals using 195-um2-Aeff fiber and inverse double-hybrid span configuration", *Optical Amplifier and their Applications 2002, PD3, July 2002*).

Regarding claims 4 and 11, **Fee** discloses the system in accordance to claims 1 and 8 as discussed above. **Fee** further teaches wherein said transmission line fiber is a single kind of fiber (col 5, ln 35-36). **Fee** does not disclose expressly wherein said transmission line fiber is being 100 μm^2 or more in effective core sectional area. **Sugahara**, from the same field of endeavor, teaches using a fiber with 100 μm^2 or more (195 μm^2 , lines 10-13, page 1) in effective core sectional area as a part of the transmission line (fig 1a). Therefore, it would have been obvious for a person of ordinary skill in the art at the time of invention to use a fiber with 100 μm^2 or more in effective core sectional area onto **Fee's** system as suggested by **Sugahara**, such that **Fee's** transmission line fiber is a single kind of fiber being 100 μm^2 or more in effective core sectional area. The motivation for doing so would have been to expand the effective core area of the transmission fiber to reduce the nonlinearity of the fiber itself.

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7. Claims 5 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Fee et al.** (*US006650842B1*), in view of **Aikawa et al.** (*US006965719B2*).

Regarding claims 5 and 12, **Fee** discloses the system in accordance to claims 1 and 8 as discussed above. **Fee** does not disclose expressly wherein said dispersion compensation element is a dispersion compensation fiber being -200 ps/nm/km or less in dispersion value. **Aikawa**, from the same field of endeavor, teaches a dispersion compensation element is a dispersion compensation fiber being -200 ps/nm/km or less in dispersion value (*col 4, ln 64-67, the range of -70 ps/nm/km or less also covers the range of -200 ps/nm/km or less*). Therefore, it would have been obvious for a person of ordinary skill in the art at the time of invention to use a dispersion compensation fiber being -200 ps/nm/km or less in dispersion value onto **Fee's** system as suggested by **Aikawa**. The motivation for doing so would have been to accurately compensate for dispersion using a common, well known, and commercially available technology (*Aikawa, col 2, ln 4-6*). Furthermore, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. In re Swain et al., 33 CCPA (Patents) 1250, 156 F.2d 239, 70 USPQ 412; Minnesota Mining and Mfg. Co. v. Coe, 69 App. D.C. 217, 99 F.2d 986, 38 USPQ 213; Allen et al. v. Coe, 77 App. D.C. 324, 135 F.2d 11, 57 USPQ 136.

8. Claims 6 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Fee et al.** (*US006650842B1*), in view of **Tsuritani et al.** ("*21.4 Gbit/s x 56 WDM 9170 km transmission using symmetrical dispersion managed fiber span*", *European Conference on Optical Communication 2001, PD.M.1.6, September 2001*).

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Regarding claims 6 and 13, **Fee** discloses the system in accordance to claims 1 and 8 as discussed above. **Fee** further teaches there is a small quantity of variation in accumulated dispersion of said transmission span (*fig 11*). **Fee** does not disclose expressly wherein the quantity of the variation is 500 ps/nm or less. **Tsuritani**, from the same field of endeavor, teaches wherein the quantity of variation in accumulated dispersion of said transmission span is 500 ps/nm or less (*fig 1b shows variation is between +200ps/nm and -200ps/nm, a variation of 400ps/nm, which is less than 500ps/nm*). Therefore, it would have been obvious for a person of ordinary skill in the art at the time of invention to have a quantity of variation in accumulated dispersion of said transmission span to be 500 ps/nm or less in **Fee's** system as suggested by **Tsuritani**. The motivation for doing so would have been to provide better transmission performance.

Furthermore, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. In re Swain et al., 33 CCPA (Patents) 1250, 156 F.2d 239, 70 USPQ 412; Minnesota Mining and Mfg. Co. v. Coe, 69 App. D.C. 217, 99 F.2d 986, 38 USPQ 213; Allen et al. v. Coe, 77 App. D.C. 324, 135 F.2d 11, 57 USPQ 136.

9. Claims 7 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Fee et al.** (*US006650842B1*).

Regarding claims 7 and 14, **Fee** discloses the system in accordance to claims 1 and 8 as discussed above. **Fee** further teaches wherein the absolute value of the sum of the total wavelength dispersion value of said transmission line fiber and the total wavelength dispersion value of said plurality of dispersion compensation elements can be varied (*fig 11 shows the*

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variations of chromatic dispersion along the transmission line). **Fee** does not disclose expressly wherein the sum is not less than 20 ps/nm and not more than 60 ps/nm. **However**, absent any teaching of criticality, it would have been an engineering design choice, depending on design criteria, to have a sum of the total wavelength dispersion value of said transmission line fiber and the total wavelength dispersion value of said plurality of dispersion compensation elements is not less than 20 ps/nm and not more than 60 ps/nm. The motivation for doing so would have been to have a satisfactory dispersion output in the optical transmission signal.

Furthermore, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. In re Swain et al., 33 CCPA (Patents) 1250, 156 F.2d 239, 70 USPQ 412; Minnesota Mining and Mfg. Co. v. Coe, 69 App. D.C. 217, 99 F.2d 986, 38 USPQ 213; Allen et al. v. Coe, 77 App. D.C. 324, 135 F.2d 11, 57 USPQ 136.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Danny Wai Lun Leung whose telephone number is (571) 272-5504. The examiner can normally be reached on 9:30am-9:00pm Mon-Thur.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on (571) 272-3022. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

DWL

January 29, 2007


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